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IS 13136 (1991): Arms and Ammunition - Rifle - Air Rifle Spring Operated [PGD 28: Arms and Ammunition for Civilian Use]

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Indian Standard

ARMS AND AMMUNITION — RIFLE — AIR RIFLE SPRING OPERATED — SPECIFICATION

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 8

Arms and Ammunition for Civilian Use Sectional Committee, LMD 08

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Arms and Ammunition for Civilian Use Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

Air rifles have undergone continuous development since the sixteenth century, though most of the technical advances have been made in the last twenty years. Rifles from to well over twenty grooves in various pitch of the twist have been tried out. Considerable development have taken place in trigger mechanism in the stock and sight designs and also in the operational mechanism of the air rifle in varieties from top grade match rifles to cheaper type children's gun. A stage of perfection in the development of air rifles has been reached with the near perfection of recoilless air rifles and this has prepared a ground for standardization. Air rifle Model 23, 25, 27, 35, 50, etc, mentioned in this specification are based on original Diana British rifles popularly in use in India and elsewhere from a long period.

Of the various types of air rifles, spring operated barrel break-down type is the simplest to manufacture. When the barrel is pressed down, a cocking lever attached to the barrel block pushes the piston backward and compresses a strong spring housed in the cylinder until caught by the trigger mechanism. The cocking lever is automatically pulled to its forward position when the barrel is returned to its original place after loading a pellet in the breech end. Rifle having side or under lever have distinct advantages over the barrel break-down type in that the barrel with its sight is not constantly handled with force each time the rifle has to be cocked and loaded which not only tends to bend the barrel and disturb the sighting arrangements, but may also cause looseness and create gap between the barrel face and cylinder adversely effecting the performance of the rifle. Further, the side lever rifle has an additional advantage over the other types in that it does not cause any discomfort to the shooter in operating the rifle specially in the prone position. The side lever rifles are of two types, one is the conventional closed breech system having a separate loading device (called loader) and the other type is of open breech system in which the pellet is loaded by hand directly into the breech, thus eliminating occasional misfeed of pellet through the loader and also chances of air leakage around worn out loader. In the closed breech rifle the body itself acts as the cylinder, whereas in the open breech type the body being cut to expose the barrel mouth for loading of pellet, a separate cylinder is provided inside the body. When the cocking lever is pulled side ways (or underside) it pushes the piston backward and compresses a strong spring housed in the cylinder until the piston is caught by the trigger mechanism. The cocking lever is then pushed forward to its original place where it is held in position by a spring operated catch. The loader is then turned till the hole drilled through it is exposed into which a pellet is inserted. The loader is finally turned back to its original position. In all types of rifles, pulling of the trigger allows the piston to fly forward and thereby suddenly compressing the air in the cylinder, the forward end of which is closed except for an air port normally having 3·2 mm dia drilled in alignment with the barrel bore. Through this air port the highly compressed air forces its way into the barrel and drives the pellet forward through the bore which ultimately shoots out with a good amount of muzzle velocity about 198 m/s and above for 4·5 mm (·177) and around 168 m/s and below for 5·5 mm (·22) rifle. The front sight is positioned on the barrel at muzzle end, while the open rear sight is mounted either on the barrel block or on the cylinder piece and the rear peep sight is positioned on the rear part of the body close to the eye. The cylinder assembly which constitute the body of the rifle is half burried in the stock forward of the butt portion and is firmly secured by one or two screws passing through the support block at front underside (or side ways) of cylinder and by a long screw at the rear end which also acts as screw front trigger guard. The piston, main spring and air transfer port have great influence on the consistency of velocity and potential accuracy and as such the piston head shall be sealed properly to avoid air leakage. The common seal is well lubricated leather washer. The piston seal must remain moist with lubricant and only high flash point lubricant like silicon oil shall preferably be used to avoid dieselling action (detonation) since compressed air in cylinder may be heated to a very high degree of temperature for a fraction of second. It is a good commercial practice to make provision in the rifle body to allow fitment of telescopic sight and to incorporate safety system to prevent shooting till the safety remains in the lock position.

The standard has been formulated in the light of the technical practices followed in the country. The frequency for performance and the durability text mentioned under clause 7 is governed by GSR 991 under Arms Act 1959, Ministry of Home Affairs.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ARMS AND AMMUNITION — RIFLE — AIR RIFLE SPRING OPERATED — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements of material, manufacture, performance, inspection, testing, marking preservation and packing of 4·5 mm (·177) and 5·5 mm (·22) spring operated barrel break-down and side/under lever type air rifle Models 23, 25, 27, 35 and 50. This standard does not cover air guns having smooth bore barrel of any type or Model.

NOTE — Other models and their technical data shall be as agreed to between the supplier and the purchaser.

1.2 Sectional views showing the arrangements of the various components which generally constitute the spring operated air rifles are given in Fig. 1 for barrel break-down type and in Fig. 1A for side/under lever type. Although some items may differ according to the design of individual manufacturer in shape and also in arrangement of components, in general the sectional views given are of representative character. The comprising parts represented by numerals are listed serially in Annexes A and B for co-relating with material used for their manufacture. Views showing operation of barrel break-down, side and under lever action are given in Fig. 2 and 2A. Names of parts are given in Annex A for barrel break-down type and in Annex B for side/under lever type.

2 REFERENCES

The Indian Standards listed in Annex C are necessary adjuncts to this standard.

3 MANUFACTURING DATA

a) Bore Diameter:
   4·44 to 4·48 mm for 4·5 mm (·177) rifle
   5·44 to 5·48 mm for 5·5 mm (·22) rifle

b) Depth of Grooves : $0.08^{+0.02}_{0}$ mm

c) Number of Grooves : 8 to 12 equally spaced

d) Width of Groove : $0.60^{+0.02}_{0}$ mm

e) Twist of Rifling : Right hand or left hand

f) Pitch of Rifling : 1 turn in 300 mm to 450 mm

g) Maximum Length of Barrel : Model

23-350 mm
25-400 mm
27-450 mm
35-500 mm
35-575 mm (match)
50-550 mm

h) Total Length and Mass of Rifle :

Model	Length	Mass
23	950 mm	2·5 kg
25	1 050 mm	3·0 kg
27	1 100 mm	3·5 kg
35	1 200 mm	4·0 kg
35 (Match)	1 300 mm	5·0 kg
50	1 250 mm	4·5 kg

For other data, refer to Annex D. Match shooting rifle 4·5 mm (·177) calibre shall comply with the specifications indicated in Annex E. 5·5 mm (·22) air rifle is not permitted for match shooting.

4 MATERIAL

4.1 Steel and other material used for manufacture of rifles are given in Annexes A and B. Other equivalent materials according to the design may be used provided the performance and durability of the rifle are not adversely affected.

4.2 Test certificate of material for barrel, piston catcher and main spring shall be obtained from recognised laboratory if possible, showing the physical, chemical and mechanical properties.

5 MANUFACTURE

5.1 Barrel

The bore shall be free from scratches, cracks, seams, pit marks, tool marks, bulges dents or rusts. Before undertaking rifling operation, the bore shall be smooth finished to the required size and no roughness on surface shall be present. The barrel shall be strong enough to withstand the strain caused during normal use of the rifle and shall not show signs of bending.

A cone 5·4 dia × 5° for 4·5 mm (·177) and 6·4 dia × 5° for 5·5 mm (·22) shall be provided at breech face to facilitate loading of pellet.

5.2 Trigger

The trigger shall return to its forward position immediately on release, after partial or complete trigger pull. The trigger shall be smooth and free from 'creep'. The word creep is interpreted to mean any perceptible dragging or slipping action of the trigger which prevents normal release of the piston mechanism when proper pressure is applied. The first stage trigger movement shall not be too low, about 6 mm is minimum required. It is a good feature to have provision in the trigger mechanism for adjustments of lengths and also weight of trigger pull.

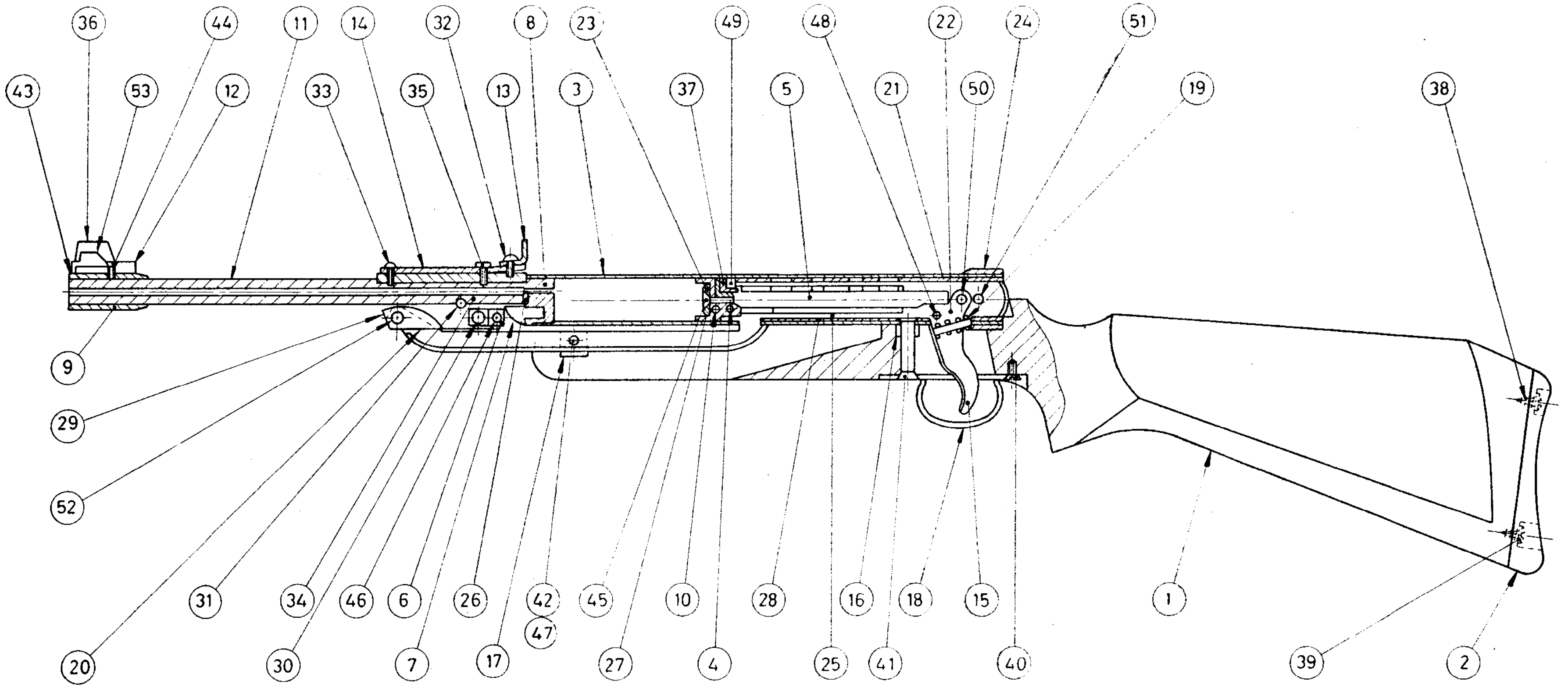


FIG. 1 BARREL BREAK-DOWN TYPE AIR RIFLE

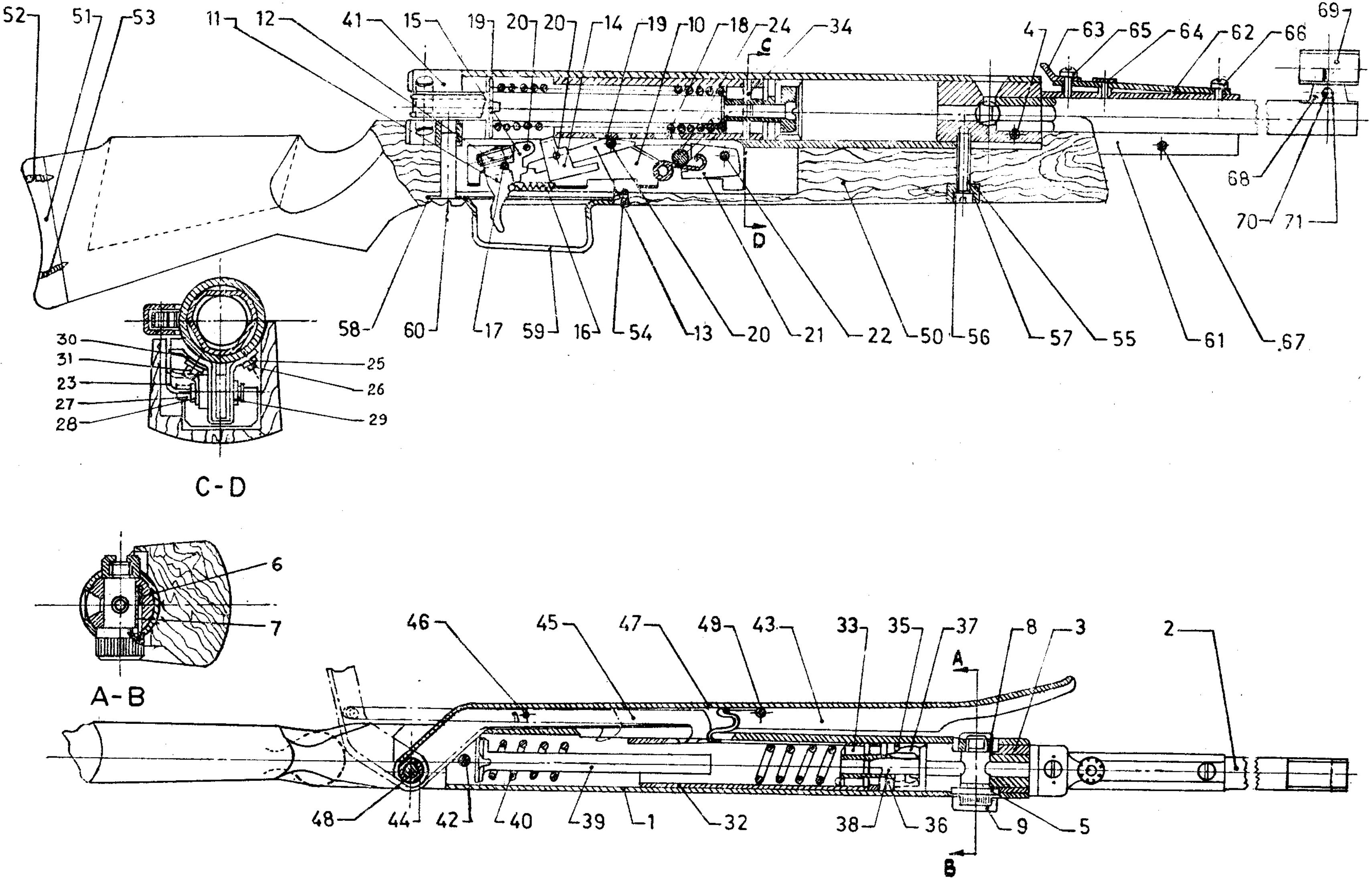


FIG. 1A SIDE/UNDER LEVER TYPE AIR RIFLES

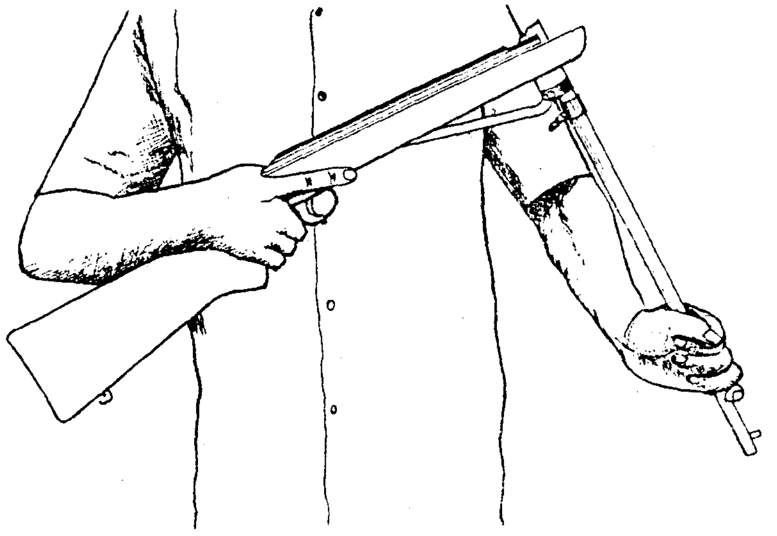
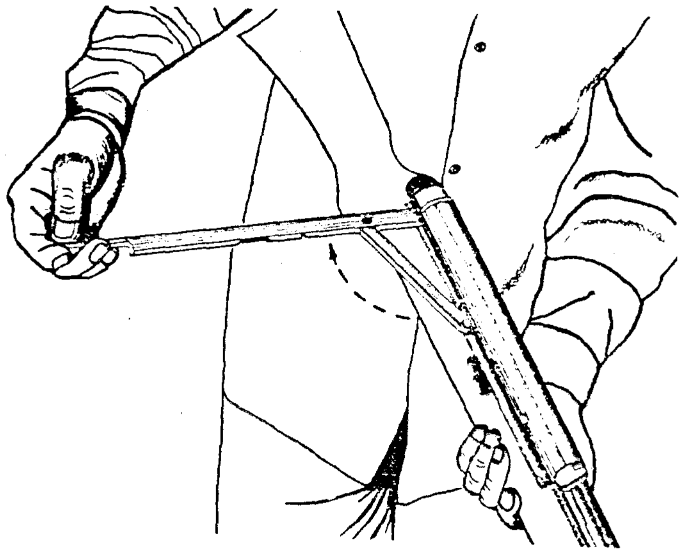
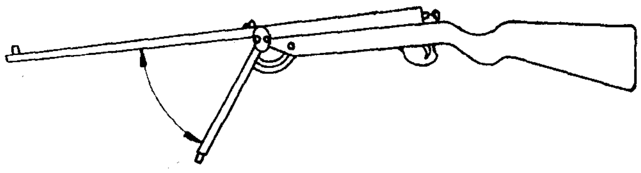


FIG. 2 COCKING OPERATION OF BARREL BREAK-DOWN TYPE AIR RIFLE



SIDE LEVER



UNDER LEVER

FIG. 2A OPERATION OF SIDE/UNDER LEVER TYPE AIR RIFLE

5.3 Trigger Guard

The rifle shall be provided with a trigger guard of conventional type. The width shall not be less than 12·5 mm.

5.4 Main Spring

The main compression spring shall be made from good quality spring steel for efficient working of the piston system. It shall have adequate service life and shall be able to withstand the endurance test prescribed in **7.4** without distortion, breakage or malfunctioning.

NOTE — Use of unduly strong main spring shall be avoided which not only creates difficulties in cocking the rifle but may also attract Clause 1 (3), Schedule II of Arms Rules, 1962 requiring Arms Licence for the Air Rifles/Pistols (*see also* **7.1**).

5.5 Sights

The front sight comprising parts shall have no looseness when affixed to their base. The front sight shall be mounted on the barrel not beyond the muzzle and must not be offset to the side and shall be protected by a cover. The rear sight shall be capable of easy adjustments by hand. The movements with 'click' shall be distinct. The moveable parts of the rear sight shall be fitted closely enough to prevent 'shake' or 'backlash'. After required adjustments the sight shall maintain its setting during cocking and firing actions. The front and rear sights shall be strong enough to withstand breakage or bending due to accidental dropping or similar abuse to be expected in use.

5.6 Stock

If specified varieties of timber are not available, manufacturers may select other species of timber provided the stock shall not show distortion or warpage due to extremes of climatic variations and when assembled with the rifle the stock shall pass the impact resistance test specified in **7.5**.

5.7 Butt Cap or Buttplate

If the buttplate is provided, the mounting screws shall be recessed below the rear surface of buttplate and if there are serrations on the rear surface, the screw shall be below the roots of serrations.

5.8 Swivel

Swivels are not essential but when fitted to the rifle they shall not interfere with the proper holding and aiming of the rifle.

6 WORKMANSHIP AND FINISH

The rifle shall be finished with good surface smoothness all over eliminating sharp edges. All metallic surfaces shall be protected from rust by phosphating process followed by oil dipping for internal parts and by phosphating followed by black spray painting for exposed parts. As an alternative to phosphating, other established anti-rust/blackening process may be given. The timber used for stock shall be easily machineable and shall be capable of taking high degree of polish. The colour of stock after finish and polishing shall preferably be natural colour of the timber or light brown.

7 PERFORMANCE AND DURABILITY

Following tests shall be carried out after ensuring non-lethality requirement by carrying out a test on one rifle from the lot of each model as per GSR 991 under Arms Act 1959 of Ministry of Home Affairs, Government of India.

7.1 Functional Test

Each rifle shall function smoothly and properly. Each rifle shall be tested by shooting 50 good quality pellets. Cocking action by break-down of the barrel or by lever action, loading of pellet, closing of breech and shooting of the rifle shall be smooth and shall not offer any difficulty. On the first pull of the trigger the rifle shall not shoot, the rifle shall shoot only on the second pull. If safety system is provided in the rifle, ensure that the safety operates effectively. The side lever rifle having loader system shall have safety ratchets and interlock device to prevent premature release of piston in any position before the rifle is fully cocked. Rifle with open breech system shall be provided with safety catch to hold the recoil system backward in the cocked position and the cocked rifle shall not operate on pressing the trigger nor the cocking lever can move forward till such time the safety is released.

NOTE — Cocking and shooting of spring operated air rifle without loading a pellet is detrimental to the piston head and to the end of air chamber, since most of the cushioning effect of compressed air is lost and the piston will smash against the end of cylinder and may result in a cracked piston or other damages.

7.2 Zeroing

Each rifle shall have its sight set (zeroed) by the manufacturer by shooting 5 or more shots as may be necessary so that the MPI (mean point of impact) of 5 consecutive shots lies within a circle of 6 mm dia with point of aim at its centre on the target at a distance of 10 metre from muzzle. After zeroing and adjustments of backsight in the factory, enough scope for further adjustments shall be available to users. Unless this scope is available, the inspector shall reject the rifle.

7.3 Accuracy

A group of 5 shots shall be fired from each rifle supported on a suitable rest, on a target at a distance of 10 metre. All the 5 shots shall group within a 20 mm circle for 4·5 mm rifle and 25 mm circle for 5·5 mm rifle. For match rifles the grouping shall be within 10 mm circle. Known and good quality match pellets shall be used for accuracy test.

7.4 Endurance Test

One rifle shall be selected at random from a lot of 1 000 rifles, or one rifle from 4 months production whichever is less and shall be subjected to endurance test by shooting 3 000 pellets as per details given in Annex F. The rifle shall not show any malfunctioning, deterioration in accuracy, abnormal wear or show gap between chamber and barrel assembly in case of barrel break-down type or abnormal leakage of air through loader, screws and pins shall not work loose, or parts shall not break within the firing of first 2 000 shots. The automatic safety system in side or under lever rifle shall continue to function effectively. Firing shall be continued beyond 2 000 shots after tightening of screws or pins which may have worked loose till shooting of 3 000 pellets are completed to see if any further defects are exposed. The rifle shall be deemed to have failed the test if break-down takes place and shooting cannot be continued. At the end of endurance test, the grouping capacity of the rifles shall be within the limits specified in **7.3**.

7.5 Impact Resistance or Drop Test for Stock

One unserviceable or dummy rifle complete with all parts and fitted with stock (stock shall be selected at random by the Inspecting Officer from the production shop) shall be periodically subjected to this test. The periodicity will represent one such rifle from a lot of 1 000 rifles manufactured or one rifle from 4 months production whichever is lower. The rifle shall be held vertically by hand upward and dropped freely on its butt without buttplate twice on hard ground like concrete floor from a height of 0'75 metre and examined for cracks, splintering or breakages. Then the rifle shall be similarly dropped flat horizontally once on left side and once on right side, from a height or 0'75 metre. The rifle shall finally be examined for breakages or cracks in the butt. Failure of stock shall imply rejection of the species of timber used or for incorporating improvements in the design of stock by the manufacturer.

8 INSPECTION

8.1 Visual Inspection

The rifle shall be examined for general workmanship and finish to ensure; that the rifle is complete with all parts assembled together, that all sharp edges have been removed and that it is free from visible defects. The following aspects shall be specially checked:

a) All exposed metal parts have been phosphated/blackened satisfactorily;

b) The barrel is not bent. The bore shall be smooth finish and free from blemishes like cracks, dents bulge, rust, pitmarks and tool marks. Check that the bore at muzzle has been provided with a small cone or chamfer (1 mm × 45°) for consistency in shooting (*see* Fig. 3). Bend in barrel is effectively detected by 'shadow' viewing of bore which is a specialised technique. Alternatively bend may be detected by free dropping of the plug as per sketch given in Fig. 4 through the bore. The plug will be arrested, if bend is present;

c) The safety system operates effectively. Check that safety ratchet and interlock device in side lever rifle (with loader) prevent premature release of piston in any position before it is fully cocked. In open breech rifle check that the safety catch positively holds the piston backward in the cocked position making trigger ineffective;

d) The stock is free from defects. Ensure that the stock is tightly fitted with the rifle and that all screws/rivets are tight;

e) Ensure that enough scope is available in the backsight for vertical and lateral adjustments by users, and

f) Markings on the rifle is satisfactory as detailed in **10.1**.

8.2 Inspection by Gauges/Instruments

a) *Bore Diameter* — Check with 'GO' and 'NO GO' gauges, ensure that the accept bore plug freely runs through the bore and reject plug is not accepted. In case the muzzle end of 4'5 mm ('177) barrel is pressed to provide a choke (4'36 mm dia × 15 mm long as shown in Fig. 3) to improve the accuracy, ensure that 4'32 mm dia plug is accepted at muzzle. For uniform inspection the dimensions of 'GO' and 'NO GO' plug gauges are given in Fig. 5.

NOTE — Choke at muzzle is not applicable for 5'5 mm ('22) barrel.

b) *Depth and Width of Rifling* — Ensure that 'GO' rifling plug pases freely at least up to 50 mm from breech in all the grooves and that the 'NO GO' rifling plug does not enter in any of the groove (*see* Fig. 6 for gauges). In absence of plug gauge, rifling may be checked by taking sulphur cast (mixture of powder sulphur and flaked graphite in the proportion of 6 to 1 by volume poured in molten condition from breech end after plugging the bore with cotton at about 25 mm away from breech face and lightly oiling the area to be cast). Only 2 in 100 barrel or part thereof shall be checked for depth and width of riflings.

c) *Overall Length and Weight of Rifle* — The length and weight of the rifle shall be commensurate with model of the rifle as indicated in **3**(h).

d) *Trigger Pull* — Ensure that the first and second trigger pulls are perceptible distinctly and that the trigger returns to its forward position immediately on release and that no drag or creep is present. The first and second trigger pull shall be in conformity with the weights given in Annex D. For checking the trigger pull, the rifle shall be cocked and held vertically barrel pointed upwards and load applied approx on the centre of the trigger (*see* Fig. 7). The trigger shall be tested by finger for creep by applying pressure on the trigger slowly at a uniform rate.

NOTE — While there is no difficulty for inspection of barrel as per **8.1**(b) and **8.2**(a) in barrel break-down rifle, the barrel bore in side/under lever rifle is not exposed to full view from breech end. For inspection of side/under lever rifle barrel, rifles shall be selected at random from the lot of rifles submitted for inspection. The manufacturer shall arrange to dismantle the 3 rifles and submit the barrel and chamber assembled together for inspection. Based on the results of inspection of 3 barrels the entire lot of barrels of side/under lever rifles shall be sentenced.

9 RESPONSIBILITY FOR INSPECTION

The manufacturer is primarily responsible for performance of all inspection and test requirements as laid down in this standard over and above his own inspection system to cover inspection of individual components, sub-assemblies and assemblies during the stages of manufacture up to the complete rifles. Although the inspector shall normally resort to sampling inspection (that is, a few rifles selected at random) or full inspection (that is, 100 percent) of the completed rifles to his discretion, but he reserves the right for inspection of individual components/sub-assemblies at any stage of manufacture. The manufacturer shall provide within his workshop the inspector (or his representative) all facilities for carrying out the inspection and tests with necessary gauges, instruments, pellets, shooting accessories and man-power as required by him free of costs.

10 MARKING

10.1 Before protective finish each rifle shall be identified with serial number (model wise) allotted by the manufacturer for which the manufacturer shall maintain a register. Each rifle shall be clearly marked by stamping or engraving for the following as per Fig. 8:

a) Indication of the source of manufacture,

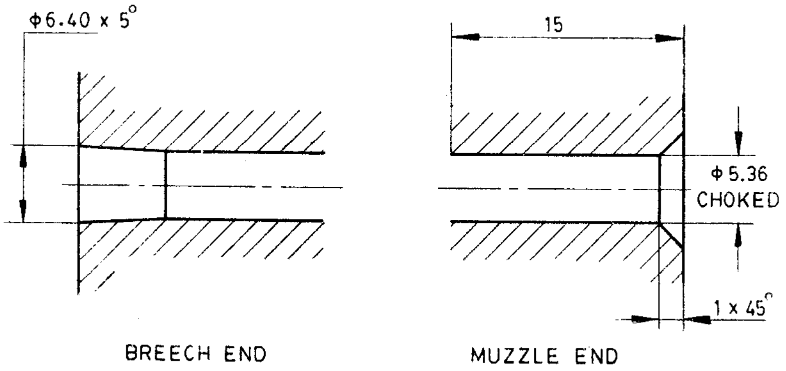
b) Name of weapon and model no.,

c) Calibre,

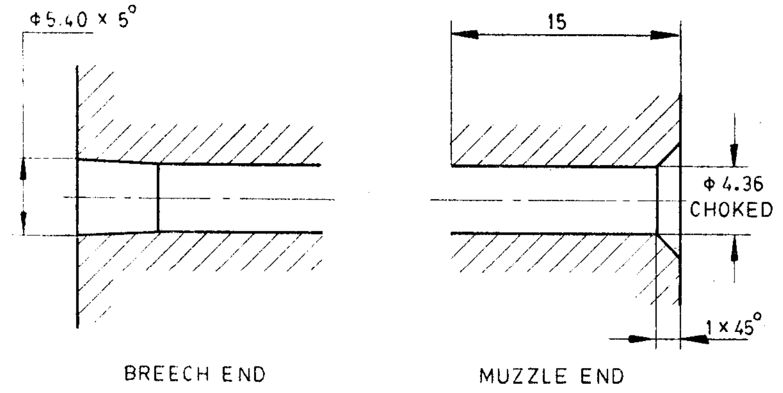
d) Year of manufacture (optional), and

e) Serial No.

10.2 The rifle may also be marked with the Standard Mark.



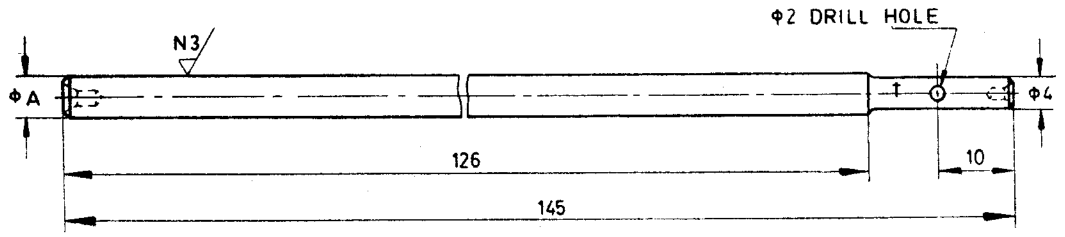
FOR 5.5 mm (0.22)



FOR 4.5 mm (0.177)

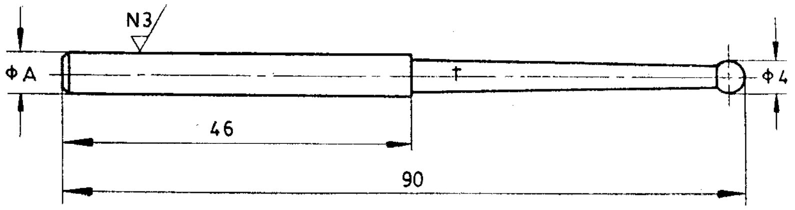
All dimensions in millimetres.

FIG. 3 BARREL BORE DETAILS AT BREECH AND MUZZLE ENDS



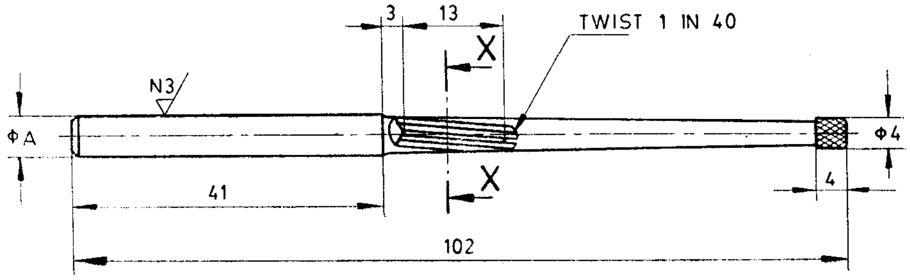
All dimensions in millimetres.

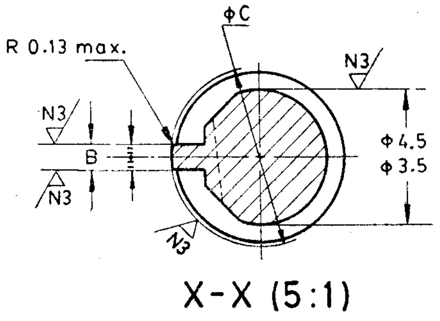
FIG. 4 BARREL BORE LONG PLUGS



All dimensions in millimetres.

FIG. 5 BARREL BORE CHECKING PLUGS





All dimensions in millimetres.

FIG. 6 BARREL RIFLING PLUG

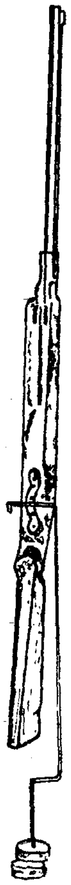


FIG. 7 CHECKING OF TRIGGER PULL

11 PRESERVATION

Before preservation treatment the rifle shall be thoroughly cleaned, specially the barrel bore shall be free from rusts, dirts or other foulings. Light preservative lubricant of known good quality shall be applied inside the barrel bore and outside metallic surfaces all over.

12 PACKING

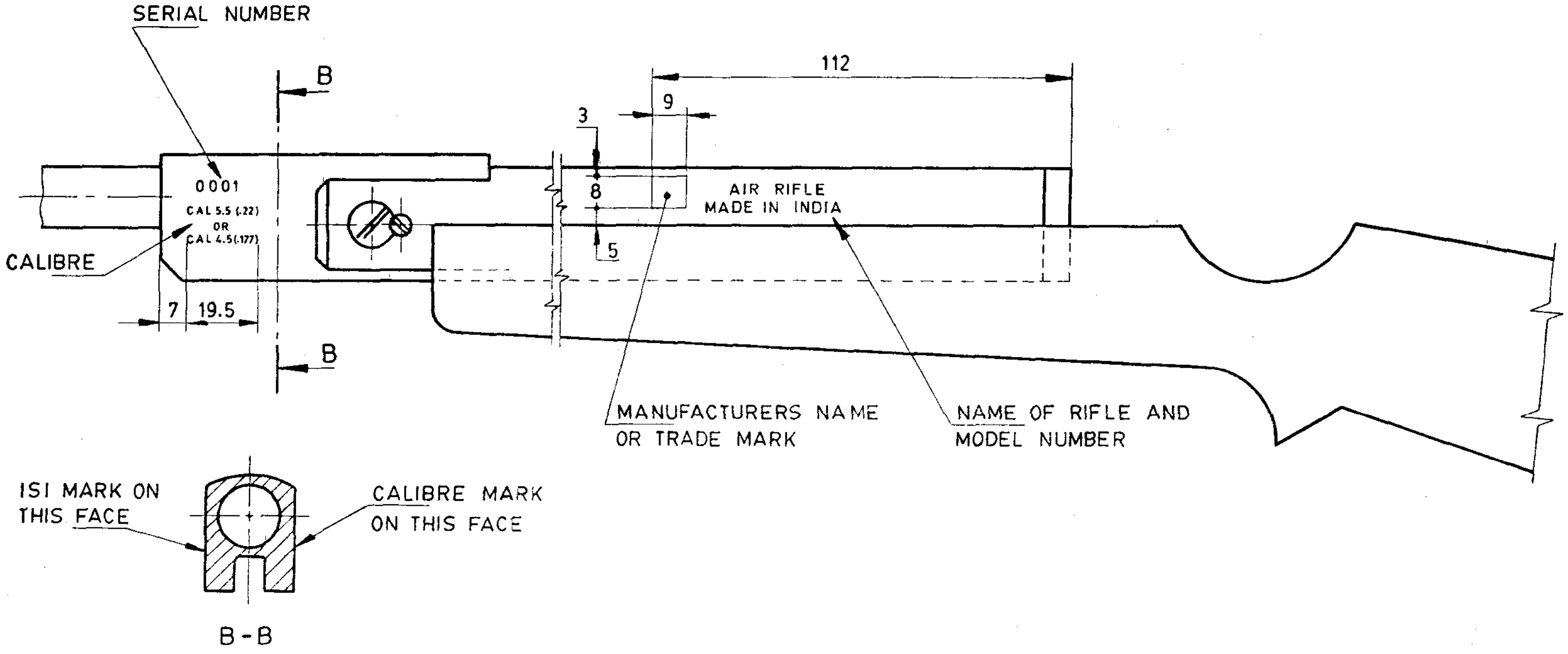
Each rifle after preservation shall be placed in a polythene cover and sealed and then packed in a suitable card-board box as per manufacturers choice, with printing on outside to indicate manufacturers name or code and also calibre, type and model of the rifle. Suitable packings shall be given inside the card-board box to avoid movement of the rifle in transit. It is also preferable to place small vapour phase inhibitor bag in the polythene cover.

13 ACCESSORIES

It is desirable that a metallic cleaning rod and brush for cleaning and oiling of barrel bore are provided with each rifle packed inside the card-board box.

14 HAND BOOK

A booklet/leaflet showing essential data like calibre, weight and length of rifle type of stock or sight provided, etc, and giving instructions for cleaning and maintenance and operation of the rifle shall be issued with each rifle packed inside the card-board box.



All dimensions in millimetres.

Fig. 8 Position of Markings on Air Rifles

ANNEX A

(*Clause* 1.1 *and* 4.1)

LIST OF PARTS AND MATERIALS FOR BARREL BREAK-DOWN TYPE AIR RIFLE

Sl No.	Name of Parts	Materials
1.	Stock	Wood conforming to IS 7549 : 1975
2.	Butt Cap or Plate	Cellulose acetate, polystrene, high density polythene or similar plastic materials or rubber
3.	Chamber or Cylinder	Seamless steel tube of steel 40Cr4Mo3 of IS 1570 (Part 4) : 1988 or CDS-I (as drawn) of IS 3074 : 1979 or CDS 38 (as drawn) of IS 3601 : 1984
4.	Piston Bush	Mild steel or 11C10 S25 IS 4431 : 1978 or 20C8 IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
5.	Piston Catcher	Steel 55C8, IS 5517 : 1978 or C15Mn75 of IS 4432 : 1967 or 40 NiCr4Mo3 of IS 5517 : 1978, hardened and tempered to Rockwell C 45/50
6.	Locking Piece in Barrel Piece	Steel 55C8, IS 5517 : 1978 or C15Mn75 of IS 4432 : 1967 or Ni6Cr4Mo3 of IS 5517 : 1978 hardened and tempered to Rockwell C45 to 50
7.	Locking Piece in Chamber Piece	Steel 55C8, IS 5517 : 1978 or C15Mn75 of IS 4432 : 1967 or 40Ni6Cr4Mo3 of IS 5517 : 1978 hardened and tempered to Rockwell C45 to 50
8.	Chamber or Cylinder Piece	Mild steel bright bar or 11C10 S25, IS 4431 : 1978 or 20C8, IS 1570 (Part 2) : 1979 (cold drawn and annealed or Fe410S, IS 226 : 1975
9.	Front Sight Sleeve	Class 2 of IS 1875 : 1978
10.	Fibre Washer (on Piston Head Behind Leather Washer)	Fibre sheet; 2 mm thick
11.	Barrel	Seamless steel tube of steel 40CrMo2 of IS 1570 (Part 2) : 1979, or CDS1 (as drawn) or IS 3074 : 1979 or CDS 38 of IS 3601 : 1984 or 35C4 of IS 1570 (Part 2) : 1979
12.	Front Sight Base	Grade EDD or DD of IS 1079 : 1988 or 7C4 of IS 1570 (Part 2) : 1979, or Mild steel or Class 2, IS 1875 : 1978
13.	Rear Sight U Plate	Grade EDD or DD of IS 1079 : 1988, or 7C4 of IS 1570 (Part 2) : 1979 or Mild steel or Class 2 of IS 1875 : 1978
14.	Rear Sight Long Plate	Grade 10Cr2 of IS 2507 : 1975
15.	Trigger	Mild steel or Class 2, IS 1875 : 1978, or 7C4 of IS 1570 (Part 2) : 1979, or Fe410S of IS 226 : 1975
16.	Curved Piece	Mild steel or Class 2, IS 1875 : 1978, or Fe410S of IS 226 : 1975
17.	Support Piece	Mild steel or Class 2, IS 1875 : 1978 or Fe410S of IS 226 : 1975
18.	Trigger Guard	St42 of IS 1079 : 1988, or Fe410S of IS 226 : 1975
19.	Trigger Spring	Grade 3 or 4, IS 4454 (Part 1) : 1981 or Grade SW or VW of IS 4454 (Part 2) : 1975 hardened or tempered.
20.	Cocking Lever	Mild steel or Class 2 IS 1875 : 1978. Case hardened (full length) or Fe410S of IS 226 : 1975
21.	Locking Pipe	CDS21 (annealed) of IS 3601 : 1984 or CDS1 of IS 3074 : 1979
22.	Trigger Link	C15Mn75 of IS 4432 : 1967 or 40Ni6Cr4Mo3 of IS 5517 : 1978 case hardened and tempered to Rockwell C45 to 50
23.	Leather Washer at Piston	Chrome leather
24.	End Cap	Fe410S of IS 226 : 1975, or St42 of IS 1079 : 1988
25.	Spring Guide	CBS 21 (annealed) of IS 3601 : 1984, or Class 2 IS 1875 : 1978

Sl No.	Name of Parts	Materials
26.	Barrel Piece Gasket	Leather or neoprene 'O' ring
27.	Washer (between Leather and Fibre Washers at Piston Head)	Delrin
28.	Main Spring	Chromium vanadium valve spring steel 50Cr4V2, IS 7494 : 1981 or Grade 3, IS 4454 (Part 1) : 1981 or Grade ID, IS 4454 (Part 3) : 1975
29.	Barrel Piece or Block	Mild steel bright bar or 11C10 S25, IS 4431 : 1978 or 20C8, IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
30.	Spring Locking Piece in Barrel Piece	Grade 3 or 4 of IS 4454 (Part 1) : 1981 or Grade SW or VW of IS 4454 (Part 2) : 1975
31.	Machine Screw	20C8, IS 1570 (Part 2): 1979 or Fe410S of IS 226 : 1975
32.	Machine Screw	
33.	Machine Screw	
34.	Machine Screw	
35.	Knurled Screw	
36.	Front Sight Hood or Cover	Grade 1 or 2 of IS 2507 : 1975
37.	Piston	Seamless steel tube of steel 40Cr4Mo3 of IS 1570 (Part 4) : 1988 or Grade CDS 1 of IS 3074 ; 1979
38.	Wood Screw	20C8, IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
39.	Wood Screw	
40.	Wood Screw	
41.	Cheese Head Machine Screw	20C8, IS 1570 (Part 2) : 1979 case hardened (quenched in oil), or Fe410S of IS 226 : 1975
42.	Cheese Head Machine Screw	
43.	C'Sunk Machine Screw	
44.	C'Sunk Machine Screw	
45.	C'Sunk Machine Screw	
46.	C'Sunk Machine Screw	
47.	Fan type or Shake Proof Washer	St42 of IS 1079 : 1988 or Fe410S of IS 226 : 1975
48.	Dowel Pin	20C8, IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
49.	Dowel Pin	
50.	Dowel Pin	
51.	Dowel Pin	
52.	Dowel Pin	
53.	Blade Front Sight	Class 2, IS 1875 : 1978 or Fe410S of IS 226 : 1975

ANNEX B

(*Clauses* 1.1 *and* 4.1)

LIST OF PARTS AND MATERIALS FOR SIDE/UNDER LEVER TYPE AIR RIFLE

Sl No.	Name of Parts	Materials
1.	Chamber	Seamless steel tube of steel 40Cr4Mo3 IS 1570 (Part 4) : 1988 or CDS-1 (as drawn) of IS 3074 : 1979 or CDS 38 (as drawn) of IS 3601 : 1984
2.	Barrel	Seamless steel tube of steel 40Cr4Mo3, IS 1570 (Part 4) : 1988 or CDS-1 (as drawn) of IS 3074 : 1979 or CDS 38, IS 3601 : 1984 or Grade 35C4 of IS 1570 (Part 2) : 1979
3.	Chamber Piece	Grade 20C8 (cold drawn and annealed) of IS 1570 (Part 3) : 1979 or Fe410S of IS 226 : 1975
4.	Dowel Pin	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
5.	Pellet Loader	40C8, IS 1570 (Part 2) : 1979
6.	Pellet Loader Spring	Grade 3 or 4 of IS 4454 (Part 1) : 1981 or Grade SW or VW of IS 4454 (Part 2) : 1975
7.	Dowel Pin	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
8.	Lock Nut	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
9.	Arrow Indicator	IS 733 : 1983
10.	Trigger Case	Type 0 of IS 513 : 1986
11.	Trigger	7C4 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
12.	Trigger Adjusting Grubscrew	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
13.	Pawl	17Mn1Cr95 of IS 4432 : 1967 or C15Mn75 of IS 4432 : 1967 case hardened to Rockwell C45 to 50
14.	Pawl Lever	Type 0 of IS 513 : 1986
15.	Safety Lever	Type 0 of IS 513 : 1986
16.	Trigger Spring	Grade 3 or 4 of IS 4454 (Part 1) : 1981 or Grade SW or VW of IS 4454 (Part 2) : 1975
17.	Dowel Pin	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
18.	Torsion Spring	Grade 3 or 4 of IS 4454 (Part 1) : 1981 or Grade SW or VW of IS 4454 (Part 2) : 1975
19.	Distance Washer	Fe410S of IS 226 : 1975 or 20C8 of IS 1570 (Part 2) : 1979
20.	Dowel Pin	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
21.	Safety Pawl	Case hardening steel IS 4432 : 1967, Grade 17Mn1Cr95
22.	Dowel Pin	Mild steel case hardened
23.	Safety Lever	Cold rolled cold assorted mild steel sheet
24.	Safety Clamp	Mild steel bright bar
25.	Washer	Mild steel

Sl No.	Name of Parts	Materials
26.	C'Sunk Machine Screw	Mild steel case hardened
27.	Round Flat Head Screw	Mild steel
28.	Washer	Mild steel
29.	Locking Washer	Spring steel
30.	Stop Plate	Cold rolled cold assorted mild steel sheet
31.	C'Sunk Machine Screw	Mild steel case hardened
32.	Piston	Case hardening steel IS 4432 : 1967 Grade 17 Mn1Cr95
33.	Piston Bush	Mild steel
34.	Dowel Pin	Mild steel
35.	Leather Washer	Chrome leather
36.	Fibre Washer	Fibre sheet
37.	Delrin Washer	Delrin
38.	C' Sunk Machine Screw	Mild steel case hardened
39.	Spring Guide	ERW Tube to IS 1239 (Part 1) : 1979
40.	Main Spring	Grade 3, IS 4454 (Part 1) : 1981 Grade 3 or 2 or Grade 50 Cr4V2, IS 7494 : 1981 or Grade ID IS 4454 (Part 3) : 1975
41.	End Cover Cap	St42 of IS 1079 : 1988 or Grade Fe410S of IS 226 : 1975
42.	Dowel Pin	20C8 of IS 1570 (Part 2) : 1979 or Grade Fe410S of IS 226 : 1975
43.	Cocking Lever	Class 2 of IS 1875 : 1978 or Grade Fe410S of IS 226 : 1975 Rear end case hardened
44.	Cocking Lever Bush	Grade Fe410S of IS 226 : 1975
45.	Cocking Link	Case hardening steel IS 4432 : 1967 Grade 17Mn1Cr95 or C15Mn75 of IS 4432 : 1967 case hardened to Rockwell C45 to 50
46.	Rivet Pin	20C8 IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
47.	Locking Spring	Grade 1 or 2 of IS 2507 : 1975
48.	Dowel Pin	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
49.	Hollow Dowel Pin	Grade 1 or 2 of IS 2507 : 1975
50.	Butt	Wood
51.	But Cap	Low density polythene or high density polythene or rubber
52.	Wood Screw	20C8 of IS 1570 (Part 2) : 1979 of Fe410S of IS 226 : 1975
53.	Wood Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
54.	Wood Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
55.	Support	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
56.	Spring Washer	Grade 1 or 2 of IS 2507 : 1975
57.	Round Flat Head Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
58.	Trigger Plate	St 42 of IS 1079 : 1988 of Fe410S of IS 226 : 1975
59.	Trigger Guard	St 42 of IS 1079 : 1988 or Fe410S of IS 226 : 1975
60.	Chease Head Machine Screw	20C8 of IS 1570 (Part 2) 1979 or Fe410S of IS 226 : 1975
61.	Rear Sight Base	Grade EDD or DD of IS 1079 : 1988 or 7C4 of IS 1570 (Part 2) : 1979 or Class 2 of IS 1875 : 1978
62.	Rear Sight Plate	Grade 1 or 2 of IS 2507 : 1975
63.	R/Right 'U' Plate	Grade 1 or 2 of IS 2507 : 1975

Sl No.	Name of Parts	Materials
64.	Knurling Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
65.	Round Head Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
66.	Round Head Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
67.	Round Flat Head Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe 410S of IS 226 : 1975
68.	Front Sight Base	Grade EDD or DD of IS 1079 : 1988 or TC4 of IS 1570 (Part 2) : 1979 or Class 2 of IS 1875 : 1978
69.	Front Sight Tube	Case hardening steel Grade 17 Mn1Cr95, IS 4432 : 1967 or C15Mn75 of IS 4432 : 1967 case hardened to Rockwell C45 to 50
70.	Round Head Screw	20C8 of IS 1570 (Part 2) : 1979 or Fe410S of IS 226 : 1975
71.	Retaining Ring	Grade 1 or 2 of IS 2507 : 1975

ANNEX C

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
226 : 1975	Structural steel (standard quality) (*fifth revision*)
513 : 1986	Cold rolled low carbon steel sheets and strips (*third revision*)
733 : 1983	Wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purposes) (*third revision*)
1079 : 1988	Hot rolled carbon steel sheets and strips (*fourth revision*)
1239 (Part 1) : 1979	Mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (*fourth revision*)
1570 (Part 2) : 1979	Schedules for wrought steels: Part 2 Carbon steels (unalloyed steels) (*first revision*)
1570 (Part 3) : 1979	Schedules for wrought steels: Part 3 Carbon and carbon-manganese free cutting steels (*first revision*)
1570 (Part 4) : 1988	Schedules for wrought steels: Part 4 Alloy steels with specified chemical and mechanical properties
1875 : 1978	Carbon steel billets, blooms, slabs and bars for forgings (*fourth revision*)
2507 : 1975	Cold rolled steel strip for springs (*first revision*)
3074 : 1979	Steel tubes for automotive purposes (*first revision*)
3601 : 1984	Steel tubes for mechanical and general engineering purposes (*first revision*)
4431 : 1978	Carbon and carbon-manganese free-cutting steel (*first revision*)
4432 : 1988	Case hardening steels (*first revision*)
4454 (Part 1) : 1981	Steel wires for cold formed springs: Part 1 Patented and cold drawn steel wires — unalloyed (*second revision*)
4454 (Part 2) : 1975	Steel wires for cold formed springs: Part 2 Oil hardened and tempered spring steel wire and valve spring wire-unalloyed (*first revision*)
4454 (Part 3) : 1975	Steel wires for cold formed springs : Part 3 Oil hardened and tempered steel wires-alloyed (*first revision*)
5517 : 1978	Steels for hardening and tempering (*first revision*)
7494 : 1981	Steels for valves for internal combustion engines (*first revision*)
7549 : 1975	Timber half wrought for sporting rifles

ANNEX D

[*Clauses* 3 *and* 8.2 (d)]

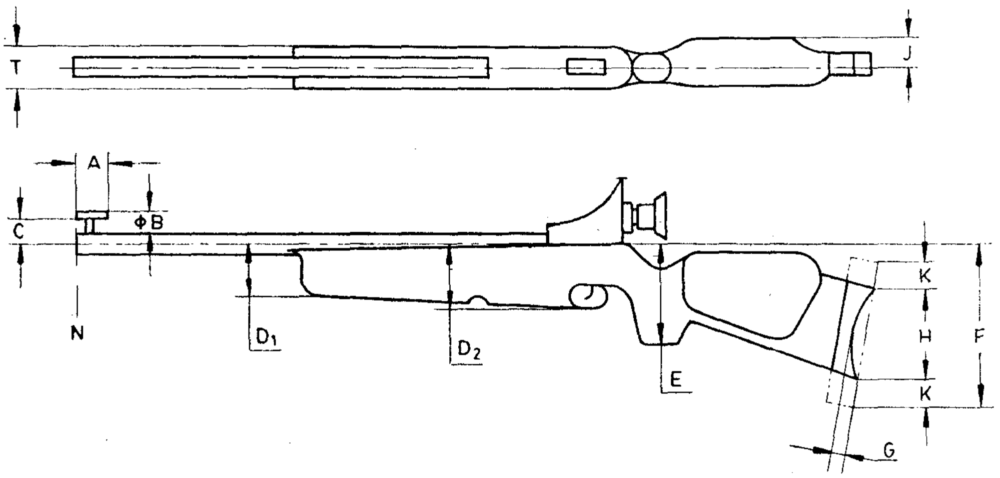
OTHER TECHNICAL DATA

a) Fore or Front Sight	Pole type, blade type, pyramid type, trunketed at top or of partridge type Protection cover to be provided
b) Rear or Back Sight	Open sight or peep (aperture) sight, adjustments for lateral and vertical movements with graduations shall be provided. Rear open sight shall preferably be mounted on chamber piece instead of barrel piece.
c) Open Sight Radius or Sight Base (Approx Value)	Model 23 — 340 mm Model 25 — 385 mm Model 27 — 435 mm Model 35 — 480 mm Model 50 — 500 mm
d) Peep Sight	Provision of peep sight is optional. If provided, the sight base shall preferably be of detachable/adjustable type for fixing at positions convenient to the users. Front sight may be of ring type.
e) Trigger Pull	First pull 0·60 kg *Max*. Second pull not to exceed 2·0 kg.

ANNEX E

(*Clause* 3.1)

DATA FOR MATCH RIFLE



NOTE — Measurements for dimensions *C*, *D*, *E*, *F* and *J* are from centre line of barrel

A	Length of front sight tunnel	50 mm
B	Diameter of front sight tunnel	25 mm
C	Distance from center of the front sight ring or top of post to center of bore (either directly above or off-set for those shooters firing from right shoulder but using their left eye)	40 mm
D_1	Depth at the front of fore end	70 mm
D_2	Depth of fore end in front of trigger guard	90 mm
E	Lowest point of rifle grip	140 mm
F	Lowest point of stock or toe of butt plate	190 mm

G	Depth of curve of butt plate	20 mm
H	Heel to toe length of butt plate	153 mm
J	Width of cheekpiece from center line of barrel	40 mm
K	Movement of buttplate upward	30 mm
L	Trigger weight	Free No set trigger
M	Weight of rifle complete with sight	5 kg
N	The front sight may not extend beyond apparent muzzle of the rifle	
T	Total thickness (breadth) of fore end	50 mm

ANNEX F

(*Clause* 7.4)

ENDURANCE SHOOTING TEST

F-1 PROCEDURE

F-1.1 Before Shooting

a) Record name of manufacturer, serial and model No. of rifle and date of test.

b) Examine condition of rifle and record:

   1) If any damage in the bore like rust, tool mark, dent, bulge or pit mark is present;

   2) Actual bore diameter;

   3) Diameter at muzzle;

   4) Straightness of bore;

   5) Trigger pull, 1st and 2nd pull;

   6) If any gap is present between barrel and chamber assembly; and

   7) Record pull required to break-down the rifle.

c) Ensure that no crack is present in the stock and sights are not loose.

d) Check all screws and pins, tighten them properly, if found loose.

e) Ensure that the rifle satisfies the accuracy requirements by firing 5 shots from a rest on a target placed at a distance of 10 metre. All 5 shots are required to group within a circle as specified in **7.3**, 3 series of shots to be fired. If the rifle does not satisfy the accuracy standard, another rifle shall be selected. Alternatively the accuracy diagram shall be preserved for comparison during subsequent shooting and endurance test continued with the selected rifle.

F-1.2 Shooting Test

a) Function the rifle by shooting 500 pellets as quickly as possible.

b) Carry out accuracy test by shooting 5 pellets as specified in **E-1.1**(e) above. Fire 3 series of shots and preserve the targets with serial numbers marked for comparison of results.

c) Examine the rifle as specified in **E-1.1**(b), (c) and (d) and record observations.

F-1.3 Repeat shooting test as specified in **E-1.2** times complete shooting of 3 000 pellets.

F-1.4 Compile final inspection report.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

AMENDMENT NO. 1 MARCH 1997
TO
IS 13136 : 1991 ARMS AND AMMUNITION — RIFLE — AIR RIFLE SPRING OPERATED — SPECIFICATION

(*Page* 8, *Fig.* 4) — Insert the following in Fig. 4:

Marking	Dimensions ϕ*A*
4.5	0 4.424 - 0.003
5.5	0 5.424 - 0.003

Tolerance — ± 0.5 mm on whole number and ± 0 .1 mm on decimals unless otherwise specified.

Material — Steel conforming to IS 3748 : 1990.

Hardness — 700 *HV Min.*

(*Page* 8, *Fig.* 5) — Insert the following in Fig. 5:

Marking	Dimensions ϕ*A*	Rifle For
L 0.44	0 4.444 - 0.003	4.5 mm (.171)
H 4.48	0 4.484 - 0.003	
L 5.44	0 5.444 - 0.003	5.5 mm (.22)
H 5.48	0 5.484 - 0.003	

Tolerance — ± 0.5 mm on whole numbers and ± 0.1 mm on decimals unless otherwise specified.

Material — Steel conforming to IS 3748 : 1990.

Hardness — 700 *HV Min.*

Amend No. 1 to IS 13136 : 1991

(*Page* 8, *Fig.* 6) — Insert the following in Fig. 6:

Rifling	ϕA	B	ϕC
Accept 4.5 mm (.177)	0 4.437 - 0.003	0.605 ± 0.002	4.612 ± 0.003
5.5 mm (.22)	0 5.437 - 0.003	0.605 ± 0.002	5.612 ± 0.003
Rifling NOT GO (Depth) 4.5 mm (.177)	0 4.437 - 0.003 0 4.457 - 0.003 0 4.477 - 0.003	0 0.55 - 0.05 0 0.55 - 0.05 0 0.55 - 0.05	4.68 ± 0.003 4.68 ± 0.003 4.68± 0.003
5.5 mm (.22)	0 5.437 - 0.003 0 5.457 - 0.003 0 5.477 - 0.003	0 0.55 - 0.05 0 0.55 - 0.05 0 0.55 - 0.05	5.68 ± 0.003 5.68± 0.003 5.68 ± 0.003
Rifling NOT GO (width) 4.5 mm (.177)	0 4.44 - 0.003	0.62 ± 0.002	0 4.60 - 0.005
5.5 mm (.22)	0 5.44 - 0.003	0.62 ± 0.002	0 5.60 - 0.005

Tolerance — ± 0.5 mm on whole numbers and ± 0.1 mm on decimals unless otherwise specified.

Material — Steel conforming to IS 3748 : 1990 .

Hardness — 700 *HV Min.*

(*Page* 15, *Annex* C) — Insert 'IS 3748 : 1990 Tool and die steels (*second revision*)' suitably after 'IS 3601 : 1984'.

(LM 08)

Reprography Unit, BIS, New Delhi, India